User manual Pomac CP – CP/ZA - ZA pumps

This manual has been compiled with the utmost care.
However, POMAC assumes no liability for possible deficiencies of the information in this manual. It is the responsibility of the buyer/user of this pump to ensure this information is complete and up-to-date.

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Release date: November 2012

Doc. ID. : **CE/CP (1211) EN-3.1**

DECLARATION OF INCORPORATION

(according to Annex II 1 B of the Machinery Directive (2006/42/EC – 1st Edition – December 2009)

Pomac bv
Feithspark 13
9356 BX Tolbert
The Netherlands

hereby declares completely under own responsibility that the pumps mentioned below:

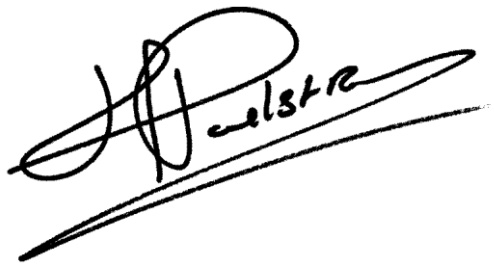
Model:	**Centrifugal pump**
Types:	**CP, CP/ZA, ZA**
Execution:	KAM, KAV, KAV, IGH
Materials:	1.4404 (AISI 316L)

to which this declaration refers to, are in conformity with the following standards:

Standards:	EN-ISO 12100 parts 1 & 2
	NEN-EN 60204 part 1
	EN 809

The pump must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of this Directive (2006/42/EC), where appropriate.

Issued at Tolbert, 29th of December 2009



H. Poelstra
Managing Director

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1. Introduction

1.1. General information

This manual provides important information regarding the correct way of installing, operating and servicing this pump.

This manual also provides information necessary to prevent the installer/operator from injury or discomfort during installation and operation of this pump and to ensure the correct use and reliable performance of this pump.

This manual represents the most recent information regarding the pump types mentioned in this manual at the time of going to print. However, POMAC reserves the right to modify the construction of the pump types mentioned, as well as the contents of this manual, without prior or afterward notification.

Read this manual thoroughly before installing, operating or servicing this pump. Ensure that operators and maintenance staff are familiar with the symbols used. Follow the instructions in this manual step by step.

1.2. Warranty

Warranty is strictly limited to the conditions specified by POMAC and will only be granted according to these conditions.
Warranty will only come into force provided that:

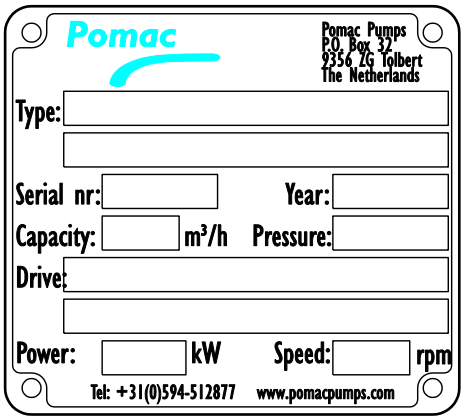
- the pump has been installed and put into operation strictly in accordance with the instructions given in this manual.
- maintenance and repairs have been carried out according to the instructions given in this manual.
- exclusively original POMAC parts or parts provided by POMAC have been used for replacing parts.
- the pump has not been used for applications other than those shown in the specifications according to which the pump was sold.
- no changes have been made to the construction of the pump itself by the buyer.
- the damage is not the result of work carried out by persons not qualified or appointed.
- the damage has not been caused through major force.

1.3. Transport and receipt

1. Check to see if the pump has not been subject to damage during transportation. If this is the case, report it directly to the carrier and to POMAC;
2. If the pump is delivered on a pallet, leave it on the pallet for as long as possible. This facilitates internal transport.
3. If a suitable hoisting device is available, use this if the pump is fitted with lifting eyes.
4. With the exception of the motors fitted with a stainless steel shroud, the motors (pumps) from construction size 112 or 132 can be fitted with a screw-in lifting eye.

Motor size	100-112	132	160	180	200
Lifting eye thread size	M8	M10	M10	M12	M16

1.4. Pump identification



- On the type plate of the pump the serial number and the type code are indicated. The type code describes the arrangement of the pump.
- Always refer to the serial number and the type code in any correspondence and when ordering parts.

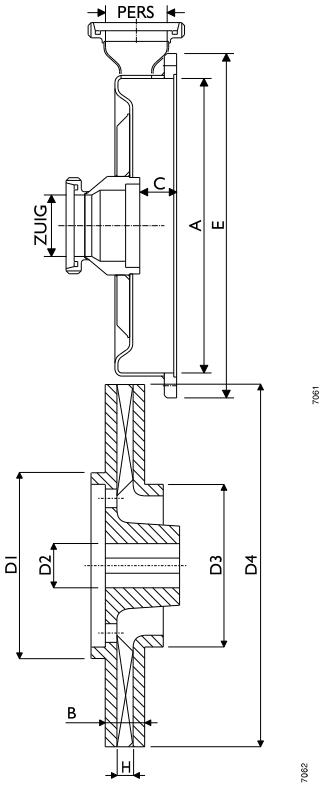
☛ *These pump data are also stated on the first page of this manual.*
If the pump type plate is missing, please provide us with the following details so that we can establish the correct pump size:

Pump cover

Diameter A	
Diameter E	
Depth C	
Diameter suction	
Diameter discharge	
Connection:	Flange or coupling

Impeller

Diameter D1	
Diameter D2	
Diameter D3	
Diameter D4	
Impeller width B	
Blade width H	
Impeller type	Closed, half open or open (star)



Motor

There is a motor type plate on the motor itself.

1.5. Type code

The type code consists of the following items:

x	x	x	-	x	-	x	-	x	-	x	-	x	-	x
1	2	3		4		5		6		7		8		9

Example: **CP 15544 – KAM – 2 – 0750 – S1 – AG - XPS**

1. Type

CP / CPZA / ZA

2. Pump size

155 / 195 / 235 / 290 / 360

3**. Connection sizes**

22 / 33 / 44 / 66 / 88 / 108 / 1210

4. Construction

KAM / KAC / KAC(M) / KAV

5. Electric motor poles

2 / 4 / 6

6. Power

0.55	=	0055
7.5	=	0750
18.5	=	1850
37	=	3700

7. Mechanical seal

S1 = mechanical seal, unbalanced, internal
S2 = mechanical seal, unbalanced, external
B1 = mechanical seal, balanced, internal
Q1 = double mechanical seal with Quench, unbalanced
Q2 = double mechanical seal with Quench, 1-side balanced
F1 = double mechanical seal, Back to Back, with Flush

8. Connections

A = DIN 11851
B = SMS 1145
C = Tri Clamp
D = DIN 11864-1
E = Flanges DIN 2633
F = special connection
G = inch
H = metric

9. Options

V = heating jacket
I = drain
T = turbine
X = ATEX
P = PTC probe in electric motor
S = extra surface roughness treatment internal parts
W = internal parts hardened

1.6. Ordering spare parts

An order form for ordering spare part is included in the documents accompanying this pump. You should state the following details on this form:

- your address data
- the **serial number and the type number** (these are stated on the type plate of the pump and on the first page of this manual).
- the **item numbers** and **quantities** of the desired parts.

☛ *See chapter 8 for the sectional drawings of the pump, with the corresponding parts lists with item numbers.*

1.7. Manufacturer

CP, CP/ZA and ZA pumps are manufactured by

Pomac bv
Feithspark 13
9356 BX Tolbert
The Netherlands
Tel +31(0) 594 5128 77
Fax +31(0) 594 5170 02
info@pomacpumps.com
www.pomacpumps.com

2. Safety

2.1. General information

This manual provides information necessary to prevent the installer/operator from injury or discomfort during installation and operation of this pump and to ensure the correct use and reliable performance of this pump.

- Read this manual thoroughly before installing, operating or servicing this pump.
- Ensure that operators and maintenance staff are familiar with the contents of this manual and with the instructions given.
- Ensure that operators and maintenance staff are familiar with the symbols used.
- Follow the instructions in this manual step by step.
- Store this manual in a place that is known and accessible to any user.

2.2. Instructions

This manual contains instructions with regard to the safety of the user, the continued good functioning of the pump and hints to facilitate certain actions or procedures.
These instructions are indicated with the following symbols:

Warning! May cause injury to the user! Act strictly in accordance with the instructions given!

! **Caution! May cause severe damage to the pump or bad functioning! Closely follow the instructions given!**

☛ *Note: Hint or instruction that can facilitate certain actions.*

Issues which require extra attention are printed in **bold**.

2.3. Staff

All personnel, in charge of the installation, operation or maintenance and overhaul of the pump, should have received the necessary training.

2.4. Precautions

When performing maintenance work to the pump ensure that the drive of the pump is shut down and can not be switched on unintentionally!

All work on and with the pump must always be in accordance with all the prevailing standards regarding occupational health and safety as well as machine safety!

Always wear protective gloves and safety goggles if the pump conveys harmful liquids that may cause injuries!

See to is that the pump is depressurized, when it has to be disassembled for overhaul!

Allow the pump to cool down first when it is used for conveying hot liquids!

2.5. Changed application

- Contact POMAC in case the pump is going to be used for other applications or in different circumstances than those specified during the initial pump selection.

3. Description

3.1. CP centrifugal pump

3.1.1. Pump description

Stainless steel sanitary centrifugal pump that is used for pumping liquids up to 500 cP. For this process a liquid flow (with a pre-pressure or an underpressure) is constantly present on the suction side.

3.1.2. Certification

Pump type CP is certified in accordance with the EHEDG directives.
Pump type CP is ATEX certified.

3.1.3. Application area

The application area goes from a capacity of 300 m^3/h to a manometric head of 13 bars.

3.1.4. Pump impeller design

Depending on the product to be pumped, the pumps can be supplied with:
- closed impeller.
- half open impeller.
- open impeller (suitable for pumping liquids with solid constituents).

3.1.5. Type description

Depending on the area of application the following types are available:

CP
- Stainless steel sanitary centrifugal pump designed with tangential outlet and suitable for system pressures up to 16 bars.

CP-H
- Stainless steel sanitary centrifugal pump designed with tangential outlet and suitable for system pressures up to 50 bars.

CP-IL
- Stainless steel sanitary centrifugal pump designed with 'InLine' connections. This makes it possible to build this pump directly in the piping.
- Available in construction sizes 15533 / 15544 / 19544 / 19555 / 19566 / 23544 / 23555 / 23566 / 23588.

CP-WW
- Stainless steel centrifugal pump for whey curds. Designed with tangential outlet. This pump was especially designed for pumping soft and vulnerable media, such as whey curds. This pump is therefore designed with a drive that has a maximum speed of 1000 min^{-1}.
- Available in construction sizes 29088WW/36088WW.

CP-T
- Stainless steel sanitary centrifugal pump, designed with radial outlet (the outlet opening of the pump is located directly above the central axis of the suction opening).

3.2. CP/ZA self-priming centrifugal pump

3.2.1. Pump description

This pump type is an extension of the pump type CP mentioned above. The CP/ZA pump distinguishes itself from this by the self-priming operation. This makes the pump highly suitable for pumping liquid/air mixtures.

3.2.2. Application area

The application area goes from a capacity of 200 m^3/h to a manometric head of 9 bars.

3.2.3. Certification

Pump type CP/ZA is ATEX certified.

3.3. ZA self-priming water ring pump

3.3.1. Pump description

This self-priming pump works according to the water ring principle and is therefore able to pump liquid/air mixtures.

3.3.2. Application area

The application area goes from a capacity of 60 m^3/h to a manometric head of 5 bars.

3.4. Connections

All pump types are available with the following connections:

- Screw coupling according to DIN 11851
- SMS 1145
- Tri-clamp
- DIN 11864-1
- DIN 11864-2
- Flanges DIN 2633
- BSP
- NPT
- Connections according to client specification

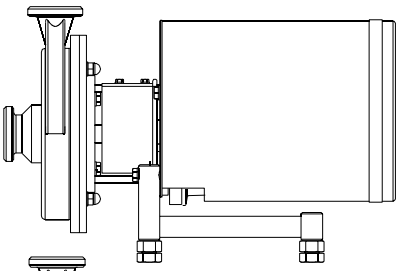
3.5. Materials

- All parts that come into contact with the liquid are designed in stainless steel 304 or 316L (Werkstoffnr. 1.4301 and 1.4404 respectively).
- All pumps are suitable for being C.I.P. cleaned.

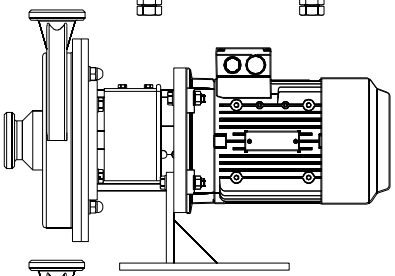
3.6. Construction variants

All pumps are available in the following, fully exchangeable designs:

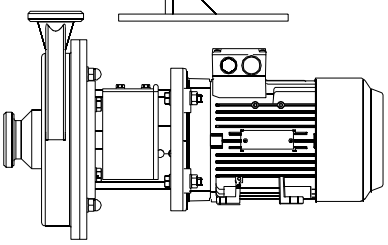
KAM
Pump and motor close coupled and placed on adjustable stainless steel feet. The motor is provided with a stainless steel shroud.



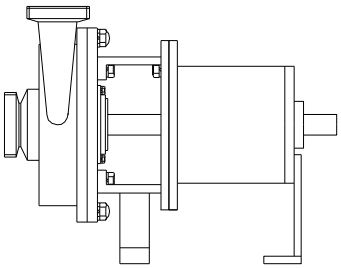
KAC
Pump and motor close coupled and placed on a steel support.



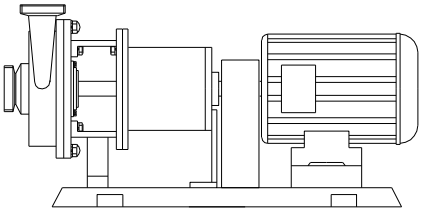
KAV
Pump and motor close coupled and placed on the motor feet.



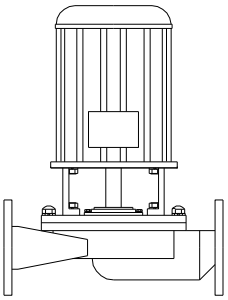
IG
Pump fitted to a bearing bracket.



IGF
Pump fitted to a bearing bracket and connected to drive motor by means of flexible coupling and placed on a base plate.



IL
Pump with InLine connections.



3.7. Shaft seals

3.7.1. Materials

The mechanical seals are standard according to EN 12756 (DIN 24960), with the exception of the build-in length.

The mechanical seals are available in the following materials:
- Carbon on silicon carbide
- Carbon on CrMo-steel
- Carbon on Ceramic
- Hard metal on hard metal
- Silicon carbide on silicon carbide
- Tungsten carbide on tungsten carbide
- Carbon on hard metal

The O-rings are available in:
- FPM (Viton)
- NBR
- EPDM
- PTFE

☛ *Pomac pumps are supplied as standard with an interior unbalanced mechanical seal (carbon on silicon carbide with EPDM O-rings).*

3.7.2. Type indication code

Code	Description
S1	interior single mechanical seal - unbalanced
S2	exterior single mechanical seal - unbalanced
B1	interior single mechanical seal - balanced
Q1	double mechanical seal with Quench - unbalanced
Q2	double mechanical seal with Quench - 1 side balanced
F1	double mechanical seal with Flush - unbalanced

3.7.3. Explanation double action mechanical seals

Quench

- This is applied where a constant pressure-free flush is required because of the product.

Flush

- This is applied when a considerable underpressure prevails on the suction side, or when a constant flushing is required in order to prevent fouling of the shaft seal. The pressure of the flushing fluid must always be higher than the discharge pressure of the pump.

3.8. Drive

- The designs **KAM, KAC and IL** are fitted with B5 flange motors acc. to IEC, provided with a balanced stainless steel extension shaft. From 11 kW on fitted with B3/B5 foot/flange motor.
- The design **KAV** is fitted with B3/B5 foot/flange motor acc. to IEC provided with a balanced stainless steel extension shaft.
- The electric motors are available in all possible voltages, insulation categories, protection categories and in low-noise and in ATEX design.
- The designs **IG and IGF** are available with air-driven, hydro, combustion and electric motors.

4. Installation

4.1. General

- The foundation must be smooth and level.
- For the KAM design set the adjustable legs using the leg adjustment bolts (510), **in such a way that the pump is stable on all 4 legs!** Secure the leg adjustment bolts with the lock nuts (511).
- Verify that the system pressure does not exceed the permitted operating pressure.
- Verify that the pipes do not show any leakage.
- The pipes must be installed and connected stress-free.
- Place a filter in front of the pump when installing a self-priming pump (ZA). The gap between the impeller and the pump casing is only 0.3 mm here, and misalignments can cause the pump to drag or seize.
- If backflow of the liquid flow is undesired, or there is a chance of undesired liquid mixing, apply a non-return valve.

! **For pump type CP/ZA a non-return valve must never be placed in the discharge pipe: it must be possible to discharge the air pumped with the suction through the discharge opening without resistance!**

4.2. Assembling Type IG

Type IG can be assembled with all drives. Proceed as follows:

1. Fit one coupling half to the pump shaft and one half to the drive shaft.
2. Place the pump on the foundation and fix it.
3. Place the drive on the foundation. Keep a gap of 3 mm between both coupling halves.
4. Level the drive to the correct height in relation to the pump using the copper shims under the motor legs. Fix the motor.
5. Align the coupling according to the following instructions.

4.3. Aligning the coupling IG/IGF design

After assembly and installation of the pump unit, the alignment of the coupling must be checked. This can be done using special aligning equipment, or by following the method described below:

1. Place a ruler over the coupling. The ruler must touch the coupling halves over the entire width, see figure 1.

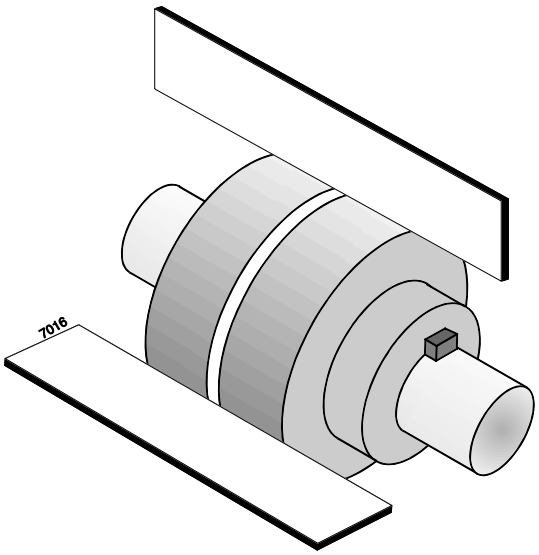


Figure 1

2. Repeat this procedure at the 3 different places around the coupling.
3. The adjustment can also be carried out using a pair of callipers on 2 points of the side surfaces of the coupling located opposite each other, see figure 2.

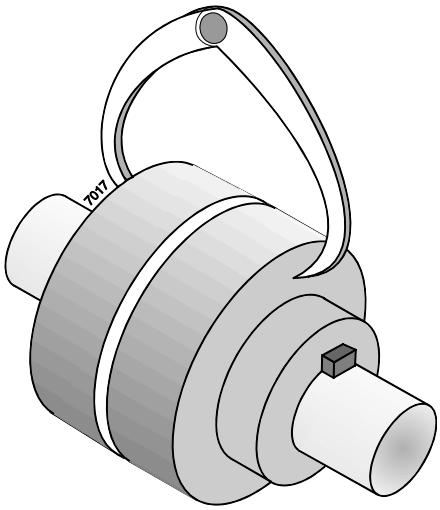


Figure 2

4.4. Connecting the electric motor

An electric motor may only be connected by a qualified electrician!

5. Putting into operation

5.1. Precautions

5.1.1. General

- Check that the shaft can turn freely. To do this, rotate the pump shaft a few times manually.
- Check that the fuses have been fitted.
- Type IG(F)(H) is designed as standard with grease lubricated ball bearings that are provided with grease for their entire life (2RS1).
- If type IG(F)(H) is designed with oil lubricated bearings, the bearing housing should be filled with oil first.

5.1.2. Quench

If provided with **quench** (shaft seals **Q1 and Q2**):

1. Connect the quench lines to the quench space. Capacity approx. **3 l/min**. **The SUPPLY line must be connected to the LOWER port!**
2. Open the inlet and outlet of these lines.
3. Set the required pressure. **The maximum pressure is 0.2 bar.**

5.1.3. Flush

If provided with **flush** (shaft sealing **F1**):

1. Connect the flush lines to the flush space. The flushing must have a capacity of approx. **3 ltr/min**. **The SUPPLY line must be connected to the LOWER port!**
2. Open the inlet and outlet of these lines.
3. Set the required pressure. **This must be 2 bars higher than the maximum occurring system pressure!**

5.2. Checking the rotation direction

1. Fill the pump with the medium to be pumped.
2. Check that the quench or flush system is set to the correct pressure.
3. Switch the pump on briefly.

Take care with any unprotected rotating parts!

4. Check that the rotation direction of the motor corresponds with the rotation direction of the pump (which is indicated by an arrow on the lantern piece). If the rotation direction is not correct, swap the connection wires L1 and L2.

This must be done by a qualified electrician!

5. Fit the guard.

5.3. Putting into operation

1. Check that the quench or flush system is set to the correct pressure.
2. Fully open the shut-off-valve in the suction pipe.
3. **Only for CP:** Close the delivery valve.
4. Switch the pump on and allow it to come up to pressure.
5. **Only for CP:** Subsequently open the delivery valve.
6. Set the pump to its required operating point.

5.4. In operation

5.4.1. Noise

The noise data stated in this manual refer to normal usage, with an electric motor. Under these conditions the noise level, measured at a distance of 1 meter and at a height of 1,6 meter, is below 85 dB(A). If after the passage of time the pump produces excessive noise, this can be an indication that there is a fault in the pump or elsewhere in the system (e.g. worn out bearings, cavitation).

5.4.2. Daily maintenance

! Regularly check the pressure of quench or flush supply if the shaft seal is equipped with it.

- Check that the high flush pressure does not provoke any undesired leakage to the liquid to be pumped.
- The valve in the suction pipe must always be completely open
- Regularly check that the inlet pressure is not too low to avoid the occurrence of cavitation in the pump
- Regularly check the delivery pressure
- Regularly check the shaft seals for leakage.

! The pump may never run without liquid

5.4.3. Cleaning procedure and agents

The pumps are suitable for being CIP cleaned.
Use the cleaning agents recommended for the products.

5.4.4. Periodic maintenance

CP, CPZA and the ZA pumps basically are maintenance free. Only the following items require periodic attention:

! Periodically check that the quench or flush system is still set at the correct pressure and capacity!

- The electric motor bearings are greased for their entire life and do not require any maintenance or subsequent lubrication. This also applies to the designs IG, IGF and IGH, if designed with grease lubricated bearings.
- Regularly check the oil level for designs IG, IGF and IGH, **designed with oil bath lubricated bearings**. This oil must also be changed annually or after every 5000 operating hours.

☛ *Check that the spent oil is disposed of in the correct manner (environment)!*

- A mechanical seal may not show any visible leakage. If this is the case, replace the shaft seal.
- If a mechanical seal does not show any visible leakage disassembly is not recommended!

5.5. Malfunction

If there is a malfunction in the pump, try to find the cause using the troubleshooting list at the back of this manual or consult your installer!

Always switch off the current first if you intend to investigate the malfunction yourself. Remove the fuse or lock the operating switch with a pad lock!

The pump can still be hot or under pressure. Allow the pump to cool down first and if possible release the pressure from the pump. Always wear the correct personal protection devices (goggles, gloves, etc.)!

6. Overhaul and repair

6.1. Removing the pump

First ensure the electric current has been switched off. Remove the fuses or switch the operating switch to OFF and lock it with a pad lock!

If the pumped liquid is HOT, first allow the pump to cool down!

1. Disconnect the electrical connections to the electric motor.
2. For designs Q1, Q2 and F1 disconnect the flushing lines.
3. Loosen the connections of the pipes and remove the pump from the piping.

6.2. Dismantling and assembling the pump

The item numbers shown (...) refer to the illustrations and the parts lists in chapter 7

6.2.1. Dismantling the pump

1. Loosen the pump cover nuts (522) and remove the pump cover (1). Inspect the pump cover O-ring (505) for damage.
2. Remove the pump shaft nut (3) and remove the impeller (2) and the O-ring (563).
3. Remove the sunk key (504).
4. If necessary dismantle the shaft seal.
5. If necessary dismantle the stub shaft.

6.2.2. Assembling the pump

1. If it has been dismantled: fit the extension shaft (49). This has to be adjusted before the pump can be further assembled, see next paragraph.
2. If it has been dismantled: fit the shaft seal (519).
3. For an interior seal check that the spring of the seal is positioned firmly against the collar of the shaft sleeve!
4. Put the sunk key (504) into the key way in the shaft and push the impeller onto the shaft.
5. Place the O-ring (563) and fit the pump shaft nut (3).

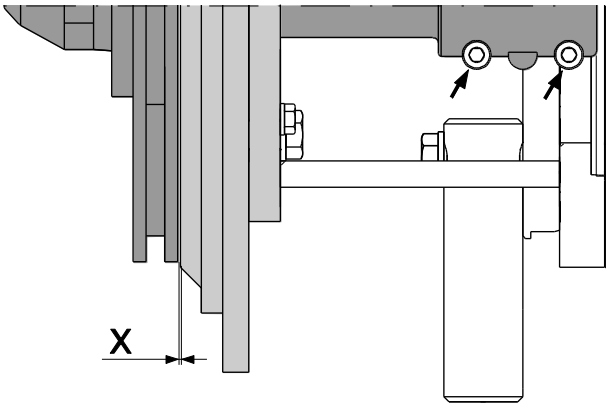
Use a feeler gauge to check that the gap between the impeller and the rear plate is correct, for values see the table in the next paragraph. If this is not the case, readjust the extension shaft!

6. Place the pump cover O-ring (505). Fit the pump cover (1) and tighten the pump cover nuts (522).

6.2.3. Adjusting the extension shaft

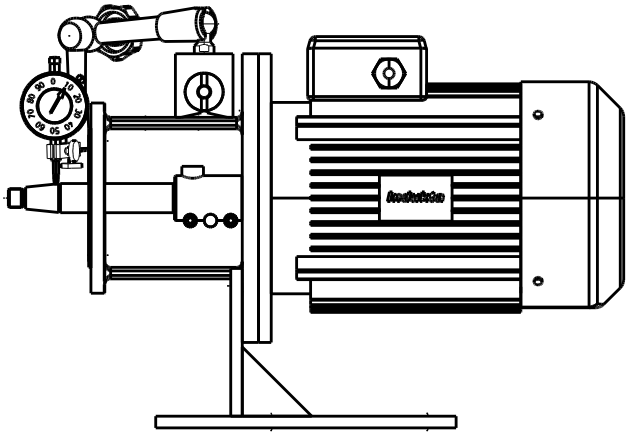
For versions KAM, KAC and KAV **before the final assembly** the extension shaft first must be adjusted on the motor shaft to set the proper gap between the impeller and the back plate later.

1. If dismantled, fit the lantern piece (15) and the back plate (6).
2. If provided with shaft sealing F1, fit shaft sleeve (23) on the extension shaft. Fit the impeller (2) and the pump shaft nut (3) to the extension shaft and fit the extension shaft to the motor shaft.
3. Place a feeler gauge of the correct thickness X between the impeller and the back plate (ZA: pump casing). Gently tighten the bolts of the extension shaft. Do not tighten the Allen screw for disassembly of the extension shaft too much.



Pump type	**X**
CP - CP/ZA Ø impeller ≤ 200 mm	1 mm
CP - CP/ZA Ø impeller >200 mm	1,5 mm
ZA	0,3 mm

4. Dismantle the impeller and the back plate and assemble the pump according to the relevant instructions.
5. Check the extension shaft for oscillation. This must not be more than 0.05 mm.



6.3. Dismantling and fitting the shaft seal

6.3.1. Instructions

The fitting/dismantling instructions can differ between manufacturers. You will find below the fitting/dismantling instructions for the most commonly applied mechanical seals in Pomac pumps.

! **In other cases, always follow the instructions that are provided by the supplier of the seal in question!**

6.3.2. Dismantling an interior mechanical seal (S1 - B1)

1. Dismantle the pump cover and the impeller.
2. Remove the rotating ring of the mechanical seal (519) from the extension shaft
3. Dismantle the back plate (6).
4. Push the static ring of the mechanical seal (519) out of the seal seat (20).

6.3.3. Fitting an interior mechanical seal (S1 - B1)

1. If it has been disassembled: Place the O-ring (508) and refit the seal seat (20) to the back plate (6) with bolts (507) and washers (506).
2. Apply some food grade grease to the seal seat (20) and press the static ring of the mechanical seal (519) into the seal seat.
3. Fit the back plate (6) to the lantern piece (15) with bolts (521) and washers (520).
4. Apply some food grade grease to the extension shaft and push the rotating parts of the mechanical seal (519) onto the shaft.
5. For shaft seal B1: line up the rear side of the mechanical seal with the shaft collar and fix the lock screws.
6. Fit the impeller and the pump cover.

6.3.4. Dismantling an exterior mechanical seal (S2)

1. Dismantle the pump cover, the impeller and the back plate (6).
2. Disassemble the back plate (6).
3. Push the static ring of the mechanical seal (532) out of the seal seat (20).
4. Remove the rotating ring of the mechanical seal (532) from the shaft.

6.3.5. Fitting an exterior mechanical seal (S2)

1. If it has been disassembled: Fit the adjusting ring (549) and adjust it according to figure 3 and the values from the table below.

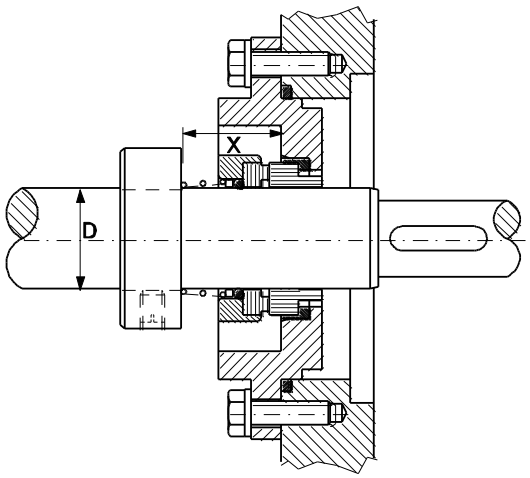


Figure 3

Applied for [kW]	D [mm]	X ± 0.5 [mm]
Up to 4	25	29
5,5 to 7,5	30	29
11 to 22	35	33,5
30 to 37	40	38
45 to 55	45	39,5

! **In case of different seal constructions follow the fitting instructions supplied by the manufacturer!**

2. Apply some food grade grease to the shaft and push the rotating part of the mechanical seal (532) onto the shaft, the seal face facing the impeller.

3. If it has been disassembled: Place the O-ring (508) and refit the seal seat (20) to the back plate (6).
4. Apply some food grade grease to the seal seat (20) and press the static ring of the mechanical seal (532) into the seal seat.
5. Fit the back plate (6) to the lantern piece (15) with bolts (521) and washers (520).
6. Fit the impeller and the pump cover.

6.3.6. Dismantling a shaft seal with quench (Q1-Q2)

1. Dismantle the impeller and the pump cover.
2. Push the rotating parts of the mechanical seal (519) from the shaft. In case of a balanced seal (Q2) loosen the lock screws of the rotating part of the seal.
3. Disassemble the back plate (6) and the seal housing (20) and remove both static rings of the mechanical seals (519 and 532 / 567) from the seal seats of the seal housing.
4. Remove the rotating part of the other mechanical seal (532 / 567) from the shaft.

6.3.7. Fitting a shaft seal with quench (Q1-Q2)

1. If it has been disassembled: Fit the adjusting ring (549) and adjust it according to figure 3 and the corresponding table.
2. Fit the rotating part of the mechanical seal **with the left-wound spring** (532) onto the shaft, the seal face facing the impeller.
3. If it has been disassembled: Place the O-ring (508) and refit the seal housing (20) to the back plate (6).
4. Apply some food grade grease to the seal seats and push both static rings of the mechanical seals (532 and 519) in the seal seats of the seal housing (20). The static ring belonging to the exterior seal (532) is fitted at motor side.
5. Fit the back plate (6) with the seal housing (20).
6. Q1: Fit the rotating part of the other mechanical seal (519) onto the shaft.
7. Q2: Fit the rotating part of the other mechanical seal (567) onto the shaft. Line up the rear side of the mechanical seal with the shaft collar and tighten the lock screws.
8. Fit the impeller and the pump cover.

6.3.8. Dismantling a shaft seal with flush (F1)

1. Dismantle the pump cover and the impeller.
2. Remove the flush supply lines.
3. Remove the back plate (6) from the lantern piece (15).
4. Remove the entire flush-configuration (20) including the shaft sleeve (23). Remove the O-ring (565).
5. Remove the seal seat (20) from the back plate and remove the O-rings (508) and the fixing ring (253).
6. Push the static rings of both mechanical seals (519 / 532) out of their respective seats.
7. Pull the rotating rings of both mechanical seals (519 / 532) from the shaft sleeve. Remove the shaft lock ring (517).

6.3.9. Fitting a shaft seal with flush (F1)

1. Apply some food grade grease into the seal seats and push both static rings of the mechanical seals (519 / 532) in their respective seats.
2. Apply some food grade grease to the shaft sleeve (23) and introduce the shaft sleeve from outside in through the short part of the seal seat (20).
3. Place the fixing ring (253) over the static seal ring in the short part of the seal seat (20).
4. Fit the rotating ring of the mechanical seal (532) onto the shaft sleeve, the seal face facing the static seal ring.
5. Fit a support ring (251) onto the shaft sleeve, bearing against the seal spring.
6. Fit the shaft locking ring (517) onto the shaft sleeve.
7. Fit the other support ring (251) onto the shaft sleeve.
8. Fit the rotating ring of the other mechanical seal (519) onto the shaft sleeve, the seal face facing outward and the spring bearing to the support ring. This set-up is called a **Back to Back** assembly.
9. Fit both O-rings (508). Assemble both halves of the seal seat and fit the assembly to the back plate (6).

10. Fit the O-ring (565) onto the shaft and push it against the collar.
11. Push the entire subassembly onto the shaft and fit the back plate (6) to the lantern piece (15).
12. Ensure the shaft sleeve does not slip out of the seal seat!
13. Fit the impeller and the pump cover.

6.4. Dismantling and assembling bearings

☛ *First dismantle the pump unit to the extent that the following parts can be reached and can be dismantled.*

6.4.1. Dismantling bearing of IG construction

1. Remove the pump.
2. Remove the electric motor and the coupling.
3. Drain the bearing bracket (38) through the lower plug (560), if the bearing is provided with oil-bath lubricated bearings.
4. Remove the bearing cover (34) and the intermediate piece (28).
5. Remove the outer circlip (517) from the bearing at drive side and push the shaft with the other bearing out of the bearing bracket.
6. Remove the other outer circlip (517) and remove the bearing from the shaft.
7. Remove the bearing from the bearing bracket.

6.4.2. Assembling bearing of IG construction

! First check both oil catchers (537) in the intermediate piece (28) and the bearing cover (34). Replace them if they are damaged!

☛ *Lubricate the inner and outer ring of the bearing, shaft and bearing seats in order to prevent seizing up.*

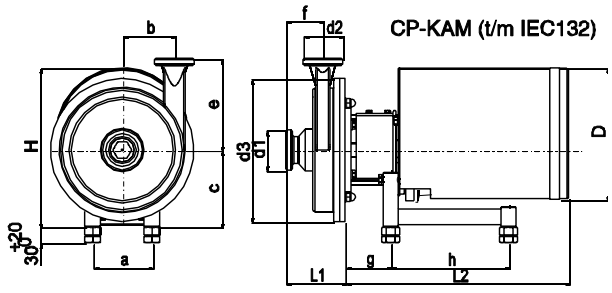
1. Press the bearing (533) into the bearing bracket (38) at pump side.
2. Fit the intermediate piece (28).
3. Insert the shaft (29) with the screw thread forward from the motor side through the bearing in the bearing bracket (38)
4. Loosen the intermediate piece (28) and fix the bearing to the shaft with outer circlip (517).
5. Refit the intermediate piece (28).
6. Fit the second bearing and fix it to the shaft with outer circlip (517).
7. Fit the bearing cover (34).
8. Fit the electric motor and the coupling. For aligning the coupling and filling the bearing bracket with oil (version IG_), see the respective paragraphs.

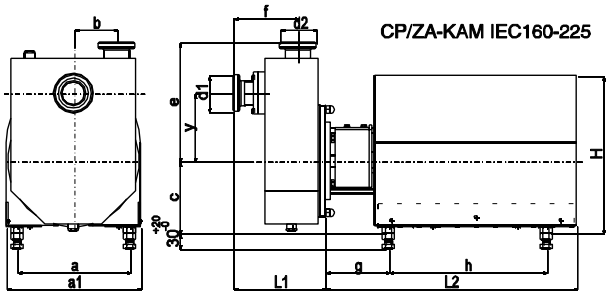
6.5. Application IEC standard motors with extension shaft

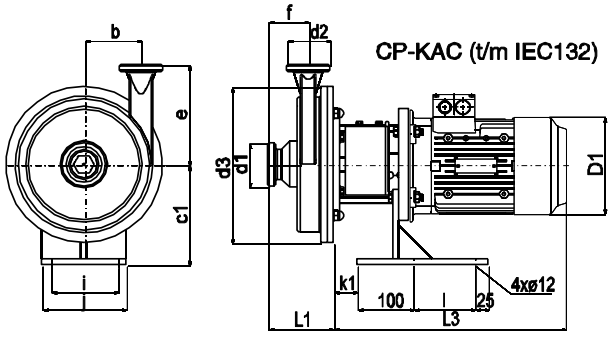
! When replacing a standard IEC standard electric motor the new motor must always be designed with an axially fixed shaft!

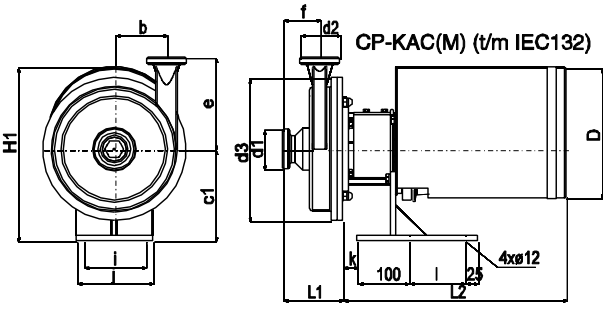
7. Dimensions

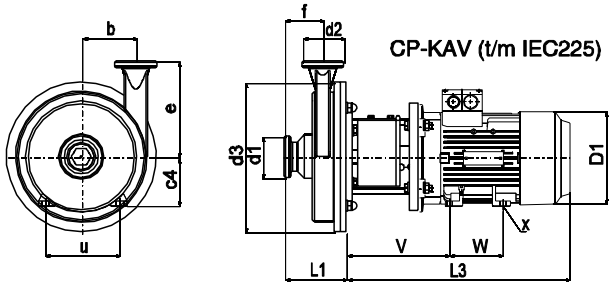
7.1. Dimensions drawings

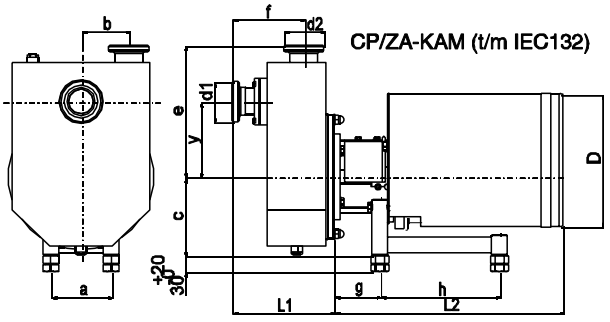


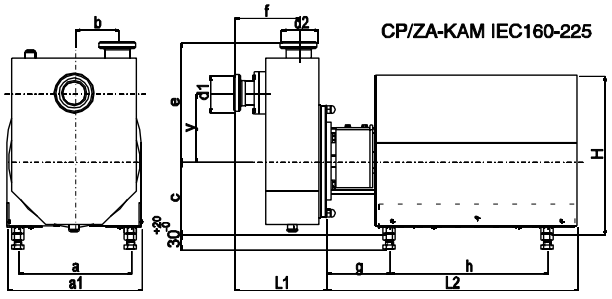


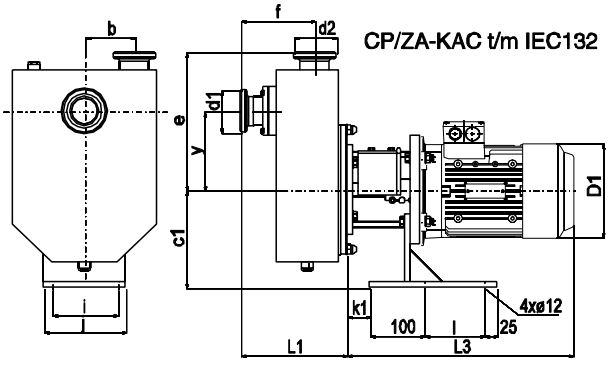


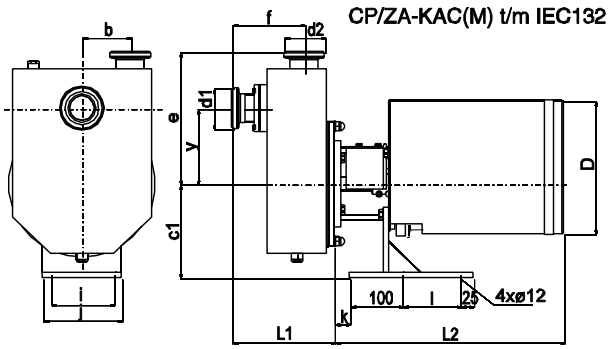











CP/ZA-KAC(M) t/m IEC132
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d1
e
y
c1
D
100
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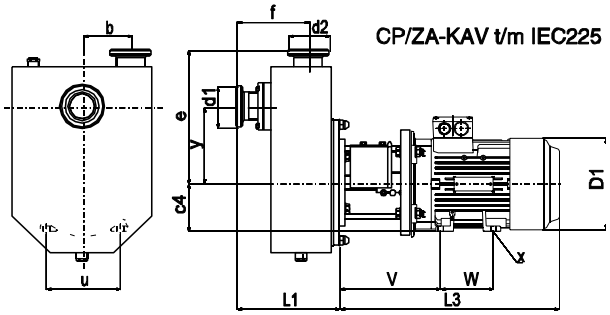
k
L1
L2


CP/ZA-KAV t/m IEC225
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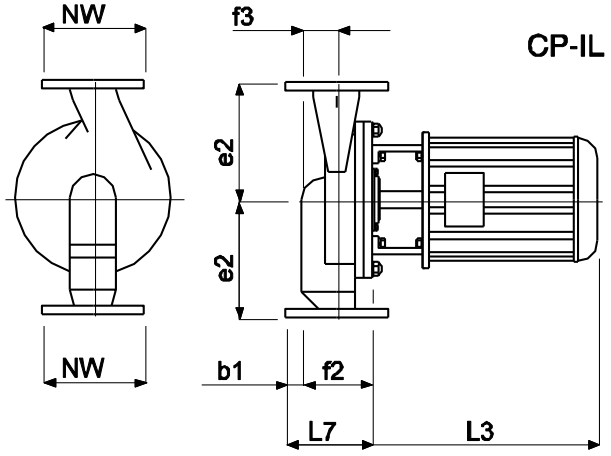
f
d2
d1
e
y
c4
D1
u
x
V
W
L1
L3


CP-IL
NW
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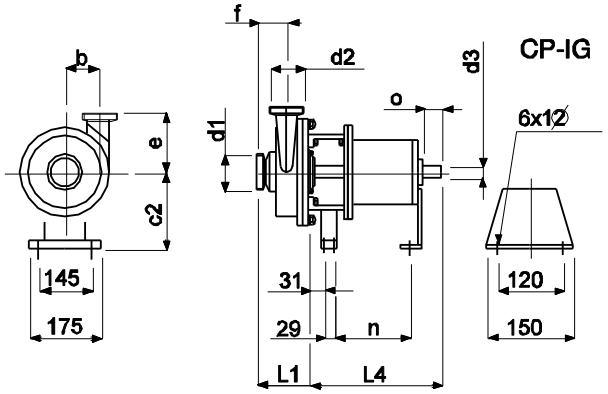
NW
b1
f2
L7
L3


CP-IG
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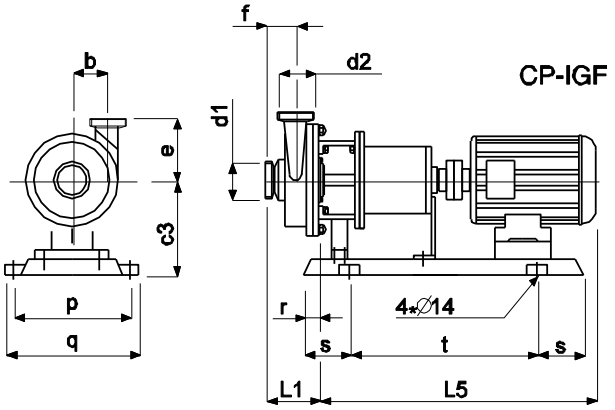
CP-IGF
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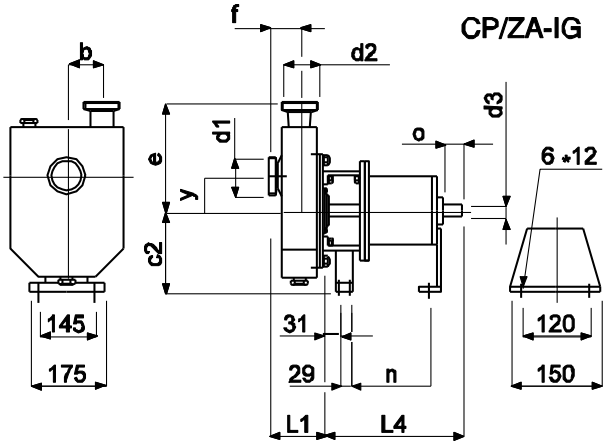
CP/ZA-IG
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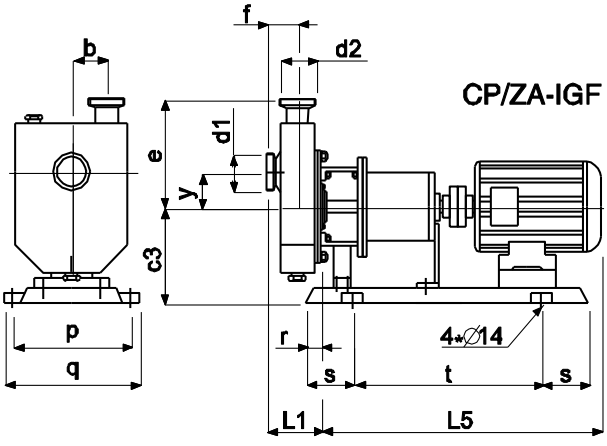
CP/ZA-IGF
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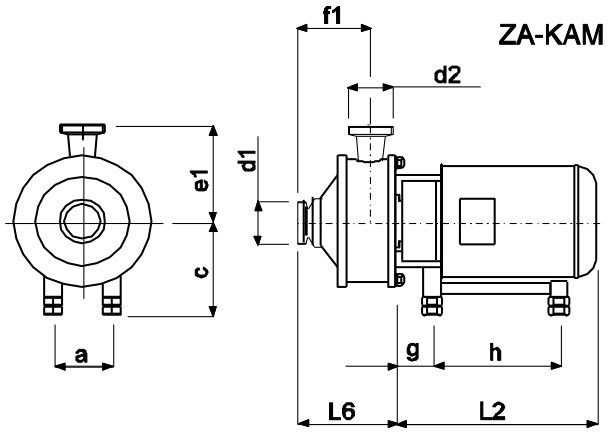

ZA-KAM
f1
d2
d1
e1
c
a
g
h
L6
L2

7.2. Dimensions CP

Construction size	d1	d2	d3	NW	b	b1	e	e2	f	f2	f3	L1	L7
15533	1,5"	1,5"	200		63		120		69			115	
15544	2"	2"	200	50	63	34	140	180	69	98	49	115	132
19544	2"	2"	239	50	80	34	160	190	69	98	49	115	132
19555	2,5"	2,5"	239	65	80	41	160	190	74	98	52	120	139
19566	3"	3"	239	65	70	38	160	200	81	98	55	129	136
23544	2"	2"	280	50	102	34	180	220	69	98	49	115	132
23555	2,5"	2,5"	280	65	103	41	180	220	74	98	52	120	139
23566	3"	3"	280	80	90	45	180	225	81	98	55	129	143
23588	4"	4"	280	100	86	49	200	240	92	98	61	147	147
29044	2"	2"	339		132		200		69			119	
29055	2,5"	2,5"	339		123		200		74			124	
29066	3"	3"	339		113		200		81			133	
29088	4"	4"	339		115		215		92			147	
290108	5"	4"	339		115		215		92			159	
36044	2"	2"	410		159		230		85			138	
36055	2,5"	2,5"	410		156		230		87			143	
36066	3"	3"	410		147		250		94			152	
36088	4"	4"	410		144		245		105			167	
360108	5"	4"	410		144		245		113			179	
3601210	6"	5"	410		120		320		125			191	

7.3. CP-WW

For the dimensions of the CP-WW (whey curds pump) the dimensions of construction size 29088/36088 can be taken.

7.4. Dimensions CP/ZA

Construction size	d1	d2	b	e	f	y	L1
15533	1,5"	1,5"	77	224	153	115	189
15544	2"	2"	77	224	153	115	189
19544	2"	2"	92	254	153	145	189
19555	2,5"	2,5"	92	258	176	145	237
19566	3"	3"	87	258	191	145	257
23544	2"	2"	113	334	153	220	204
23555	2,5"	2,5"	113	338	176	220	237
23566	3"	3"	113	339	191	220	257
23588	4"	4"	98	353	233	195	314
29044	2"	2"	138	334	153	220	204
29055	2,5"	2,5"	138	338	176	220	237
29066	3"	3"	133	339	191	220	257
29088	4"	4"	118	353	223	195	304
290108	5"	4"	118	353	223	195	304
36044	2"	2"	181	479	153	330	204
36055	2,5"	2,5"	176	483	176	330	237
36066	3"	3"	176	484	191	330	257
36088	4"	4"	161	498	233	330	257
360108	5"	4"	161	498	223	330	294

7.5. Dimensions ZA

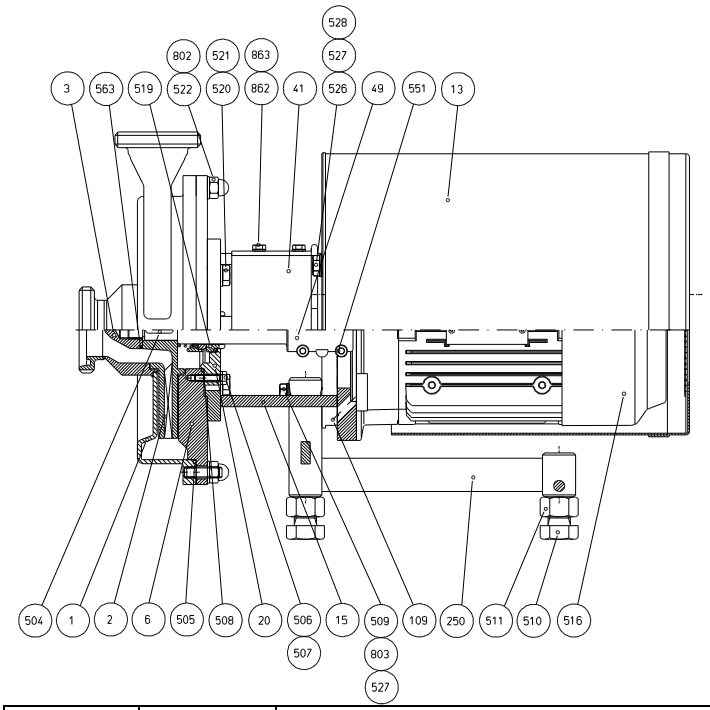
Construction size	d1	d2	e1	f1	L6
930-515	2”	2 ½”	194	205	242
40066	3"	3"	198	191	223
44086	4"	4"	211	207	239
48066	3”	3”	230	-	-

7.6. Dimensions of electric motors

Motor size	Power [kW]																										
IEC	3000	1500	1000	750	a	a1	c	c1	c4	D	D1	g	g1	h	H	H1	i	j	k	k1	l	u	V	W	x	L2	L3
80M	0,75	0,55	0,37	0,18	116		151	180	80	255	156	92	106	230	279	307	120	150	29	43	110	125	185	100	10	427	368
80M	1,1	0,75	0,55	0,25	116		151	180	80	255	156	92	106	230	279	307	120	150	29	43	110	125	185	100	10	427	368
90S	1,5	1,1	0,75	0,37	116		151	180	90	255	174	92	106	230	279	307	120	150	29	43	110	140	191	100	10	427	416
90L	2,2	1,5	1,1	0,55	116		151	180	90	255	174	92	106	230	279	307	120	150	29	43	110	140	191	125	10	427	416
100L		2,2		0,75	152		164	194	100	305	195	102	116	300	317	347	140	180	39	53	135	160	208	140	12	497	458
100L	3	3	1,5	1,1	152		164	194	100	305	195	102	116	300	317	347	140	180	39	53	135	160	208	140	12	497	458
112M	4	4	2,2	1,5	152		164	194	112	305	220	102	116	300	317	347	140	180	39	53	135	190	215	140	12	497	479
132S	5,5	5,5	3	2,2	186		187	219	132	355	259	122	136	360	365	394	160	230	59	73	165	216	254	140	12	567	539
132S	7,5				186		187	219	132	355	259	122	136	360	365	394	160	230	59	73	165	216	254	140	12	567	539
132M		7,5	5,5	3	186		187	219	132	355	259	122	136	360	365	394	160	230	59	73	165	216	254	178	12	567	539
160M	11	11	7,5	4	320	390	183		160		310	196		447	443							254	308	210	14	730	679
160M	15			5,5	320	390	183		160		310	196		447	443							254	308	210	14	730	679
160L	18,5	15	11	7,5	320	390	183		160		310	196		447	443							254	308	254	14	730	679
180M	22	18,5			320	390	203		180		364	196		447	520							279	321	241	14	860	759
180L		22	15	11	320	390	203		180		364	196		447	520							279	321	241	14	860	759
200L	30	30	18,5	15	370	445	223		200		402	198		520	570							318	343	305	18	865	820
200L	37		22		370	445	223		200		402	198		520	570							318	343	305	18	865	820
225M	45				416	490	248		225		445	213		521	615							356	357	311	18	900	856

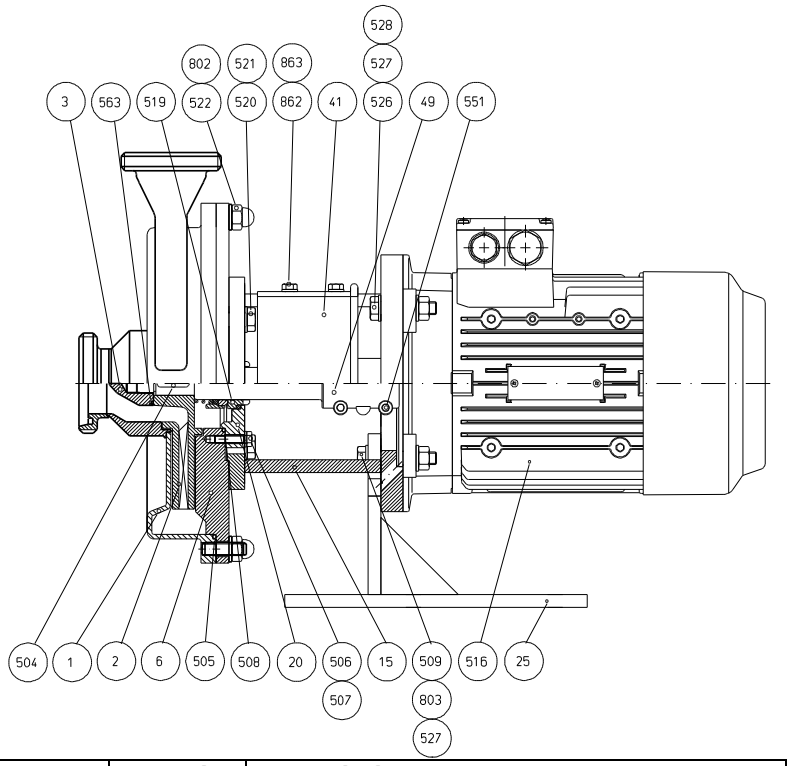
8. Sectional drawings and parts lists

8.1. KAM construction



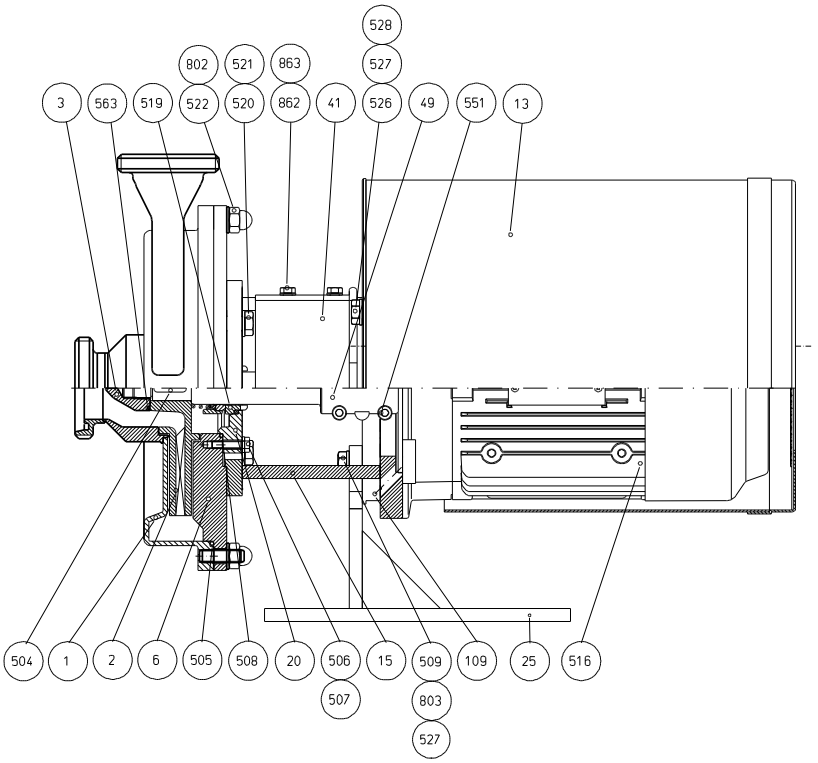
Item no.	Quantity	Description
1	1	pump cover
2	1	impeller
3	1	shaft nut
6	1	back plate
13	1	motor shroud
15	1	intermediate piece
20	1	seal seat
41	1	guard for intermediate piece
49	1	extension shaft
109	1	mounting flange for motor shroud
504	1	key
505	1	O-ring
506	4	washer
507	4	bolt
508	1	O-ring
509	2	bolt
510	4	leg adjustment bolt
511	4	counter nut
516	1	B5 flange motor
519	1	mechanical seal
520	4	washer
521	4	bolt
522	4	pump cover nut
526	2	bolt
527	4	nut
528	4	washer
551	2	bolt
563	1	O-ring
802	4	set screw
803	4	washer
862	2	bolt
863	2	washer

8.2. KAC construction



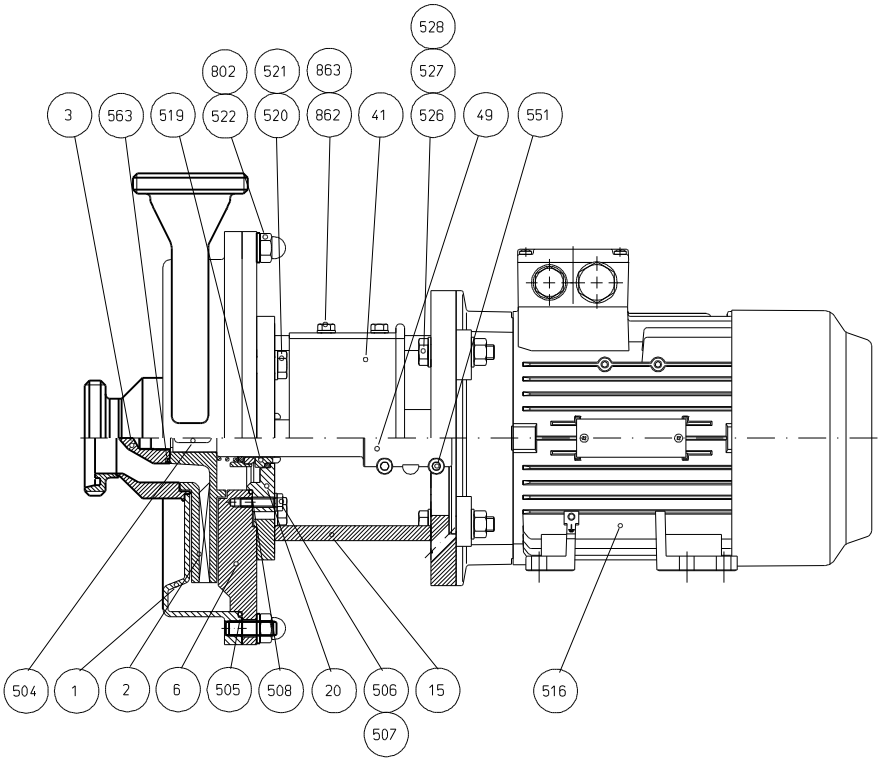
Item no.	Quantity	Description
1	1	pump cover
2	1	impeller
3	1	shaft nut
6	1	back plate
15	1	intermediate piece
20	1	seal seat
25	1	console
41	1	guard for intermediate piece
49	1	extension shaft
504	1	key
505	1	O-ring
506	4	washer
507	4	bolt
508	1	O-ring
509	2	bolt
516	1	B5 flange motor
519	1	mechanical seal
520	4	washer
521	4	bolt
522	4	pump cover nut
526	2	bolt
527	4	nut
528	4	washer
551	2	bolt
563	1	O-ring
802	4	set screw
803	4	washer
862	2	bolt
863	2	washer

8.3. KAC(M) construction



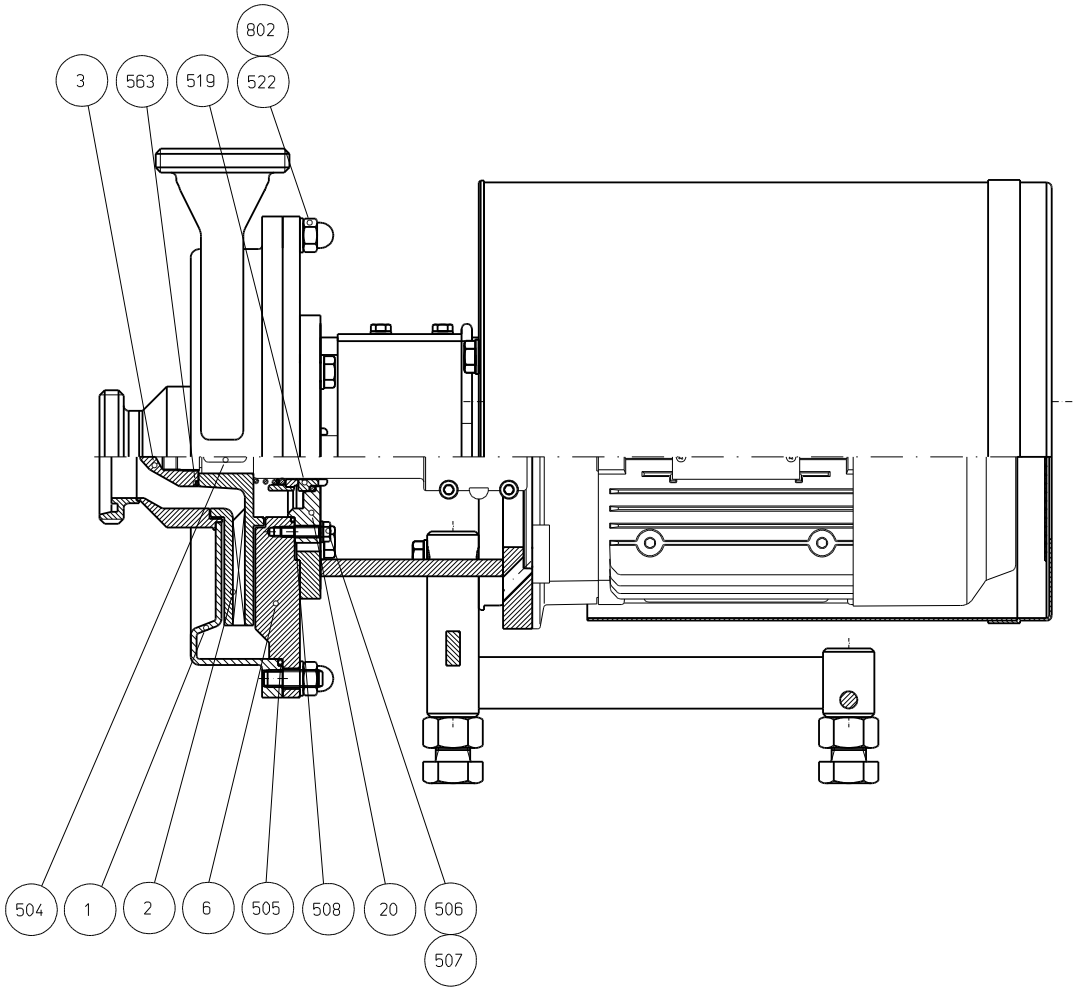
Item no.	Quantity	Description
1	1	pump cover
2	1	impeller
3	1	shaft nut
6	1	back plate
13	1	motor shroud
15	1	intermediate piece
20	1	seal seat
25	1	console
41	1	guard for intermediate piece
49	1	extension shaft
504	1	key
505	1	O-ring
506	4	washer
507	4	bolt
508	1	O-ring
509	2	bolt
516	1	B5 flange motor
519	1	mechanical seal
520	4	washer
521	4	bolt
522	4	pump cover nut
526	2	bolt
527	4	nut
528	4	washer
551	2	bolt
563	1	O-ring
802	4	set screw
803	4	washer
862	2	bolt
863	2	washer

8.4. KAV construction



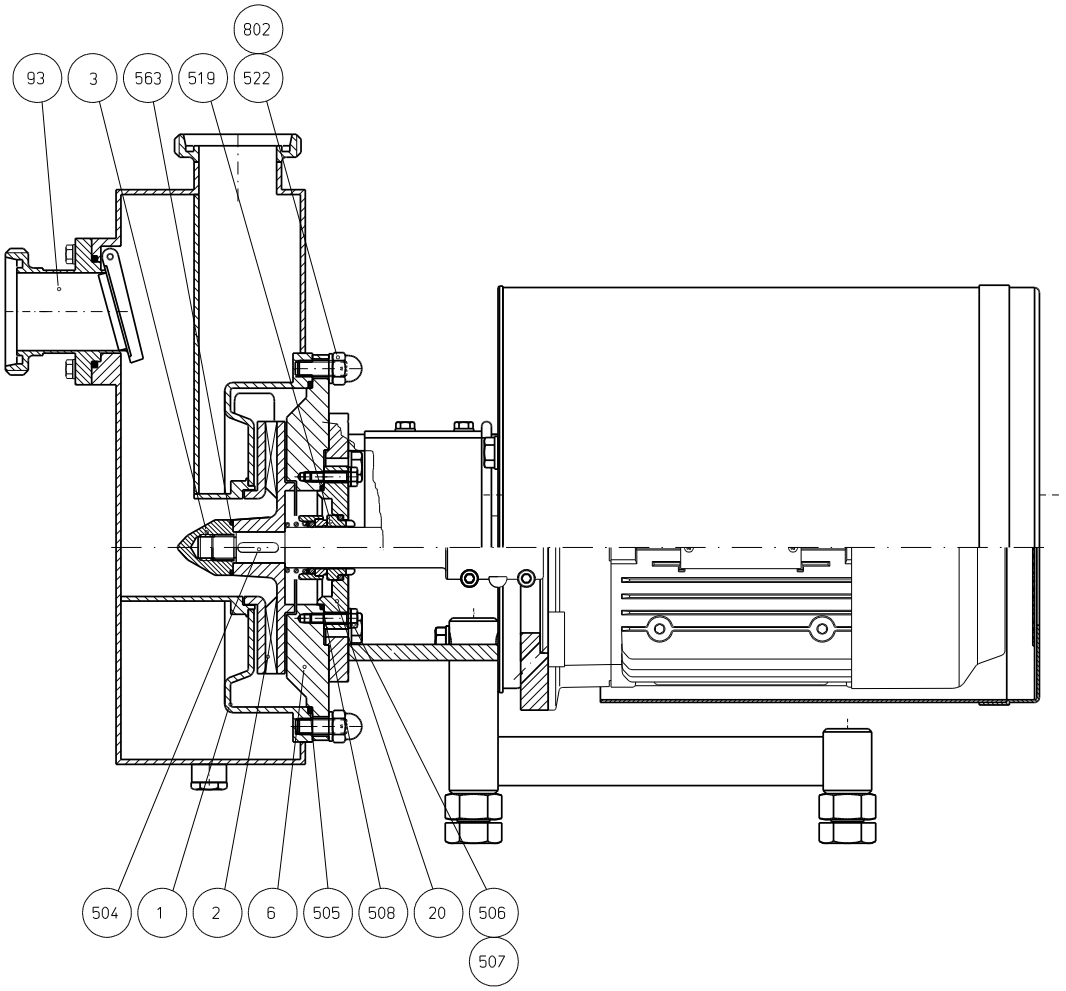
Item no.	Quantity	Description
1	1	pump cover
2	1	impeller
3	1	shaft nut
6	1	back plate
15	1	intermediate piece
20	1	seal seat
41	1	guard for intermediate piece
49	1	extension shaft
504	1	key
505	1	O-ring
506	4	washer
507	4	bolt
508	1	O-ring
516	1	B3/B5 foot/flange motor
519	1	mechanical seal
520	4	washer
521	4	bolt
522	4	pump cover nut
526	4	bolt
527	4	nut
528	8	washer
551	2	bolt
563	1	O-ring
802	4	set screw
862	2	bolt
863	2	washer

8.5. CP parts



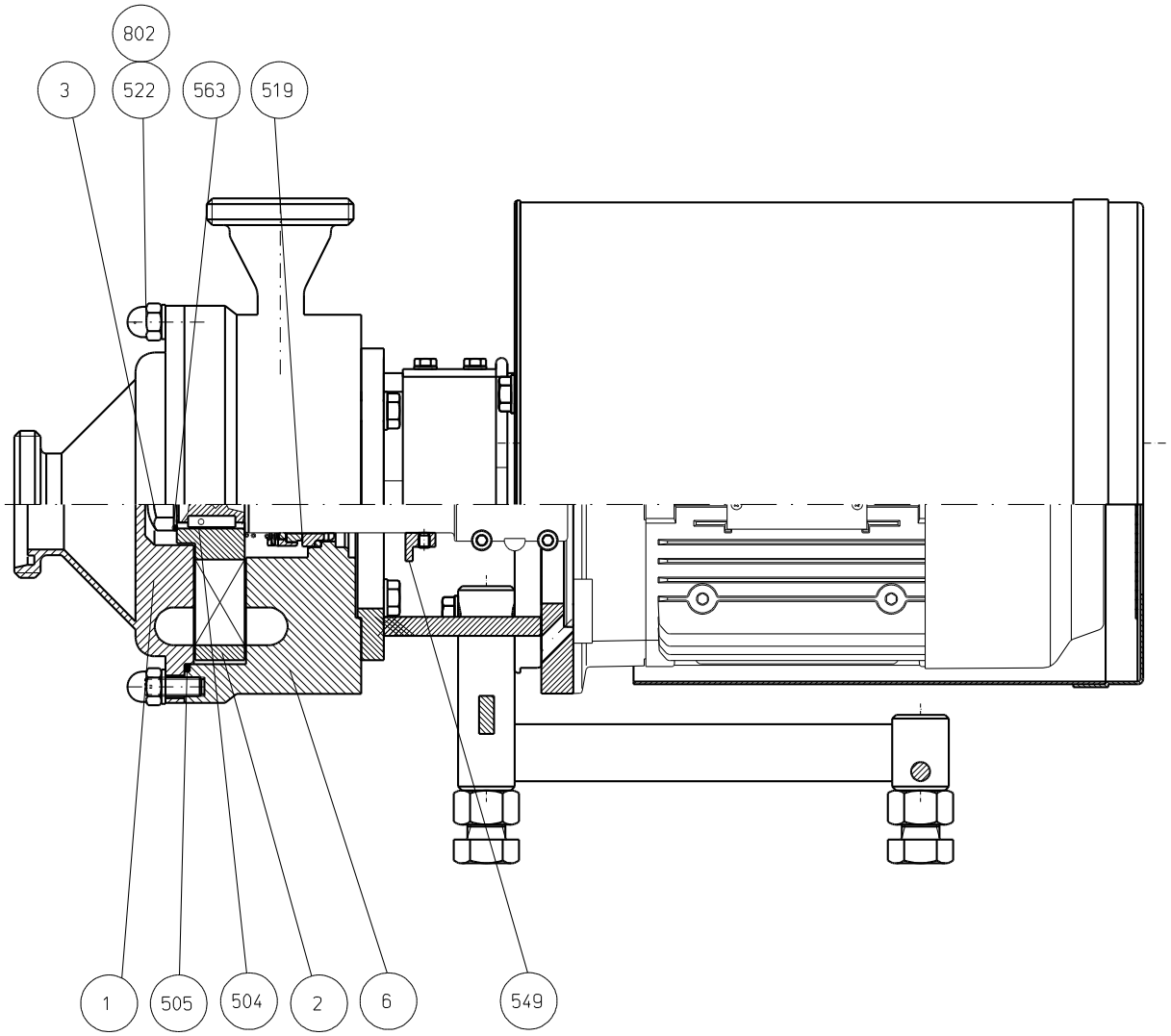
Item no.	Description
1	Pump cover
2	Impeller
3	Shaft nut
6	Back plate
20	Seal seat
504	Key
505	O-ring
506	Washer
507	Bolt
508	O-ring
519	Mechanical seal
522	Pump cover nut
563	O-ring
802	Set screw

8.6. CP/ZA parts



Item no.	Description
1	Pump cover with casing
2	Impeller
3	Shaft nut
6	Back plate
20	Seal seat
93	Suction connection
504	Key
505	O-ring
506	Washer
507	Bolt
508	O-ring
519	Mechanical seal
522	Pump cover nut
563	O-ring
802	Set screw

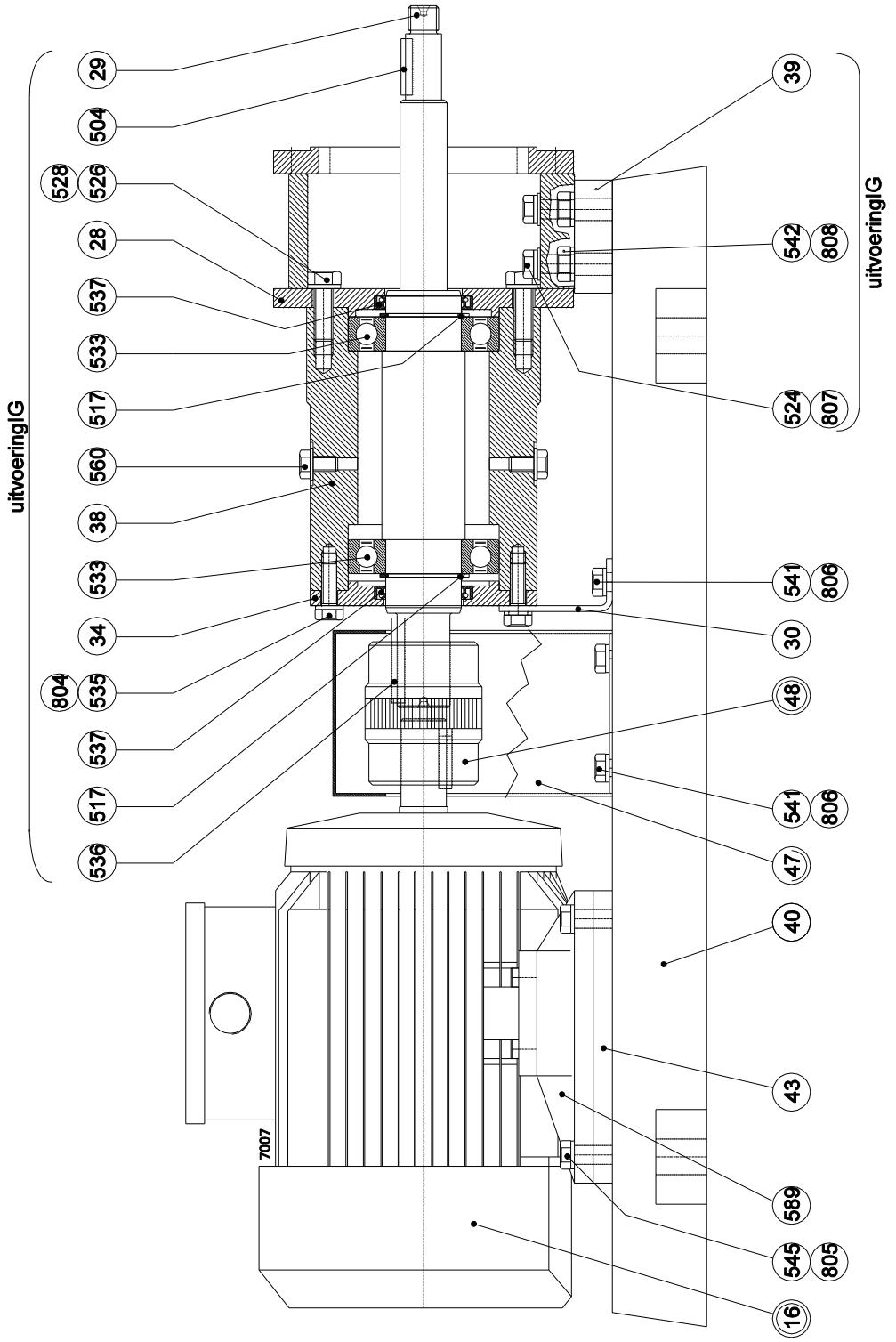
8.7. ZA parts



Item no.	Description
1	Pump cover with casing
2	Impeller
3	Shaft nut
6	Back plate
504	Key
505	O-ring
519	Mechanical seal
522	Pump cover nut
549	Splash ring
563	O-ring
802	Set screw

8.8. Parts of constructions IG and IGF

8.8.1. Sectional drawing



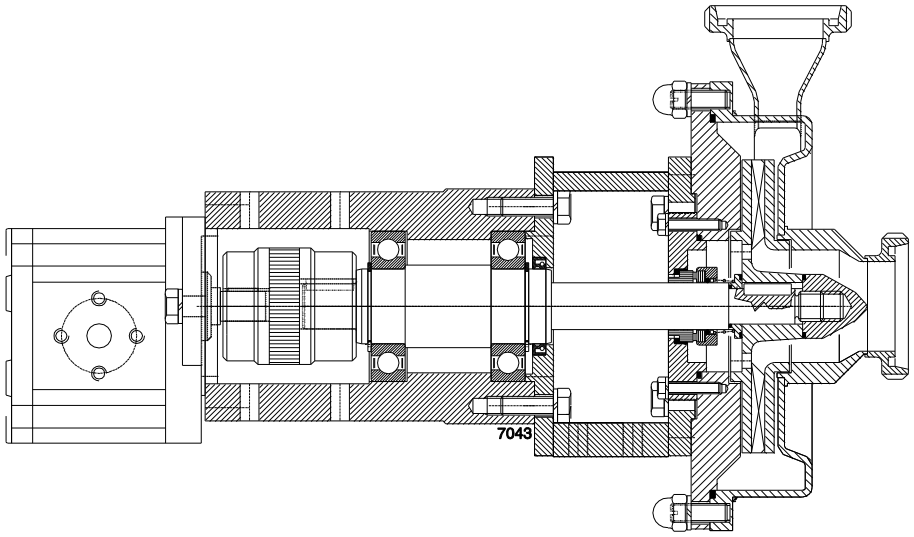
8.8.2. Parts list

The bold printed item numbers belong to the **IG** construction.

Item no.	Description
28	Intermediate piece
29	Pump shaft
30	Bearing bracket support (IGF)
34	Bearing cover
38	Bearing bracket
39	Console
40	Base plate
43	Spacer foot electric motor B3
47	Coupling guard
48	Coupling
504	Key
516	B3 foot motor IEC standard
517	Circlip
524 - **526**	Bolt
528	Washer
533	Ball bearing
535	Bolt
536	Key
537	Oil seal
541- 542 - 545	Bolt
560	Plug + sealing ring
589	Loose feet for B3 electric motor
804 - 805 - 806 - 807	Washer

8.8.3. IGH construction

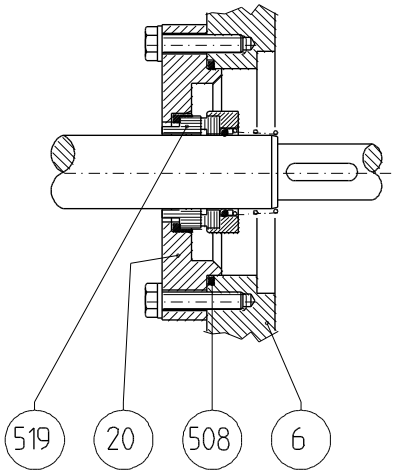
IGH is an IG construction, driven by a flanged-on hydromotor.



8.9. Shaft seals

8.9.1. Version S1

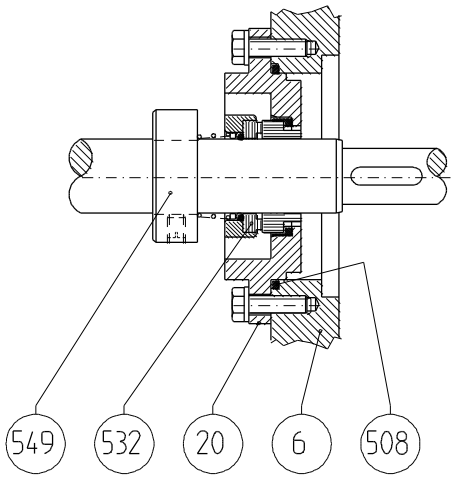
Interior mechanical seal, unbalanced.



Item no.	Description
6	back plate
20	seal seat
508	O-ring
519	mechanical seal

8.9.2. Version S2

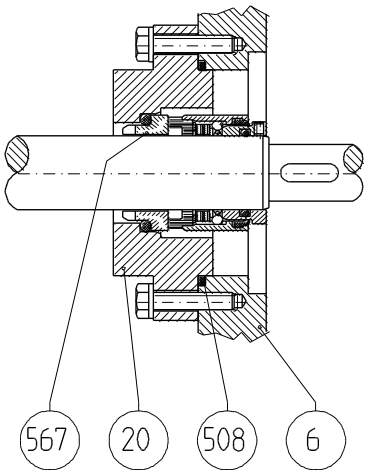
Exterior mechanical seal, unbalanced.



Item no.	Description
6	back plate
20	seal seat
508	O-ring
532	mechanical seal with left-wound spring
549	set ring

8.9.3. Version B1

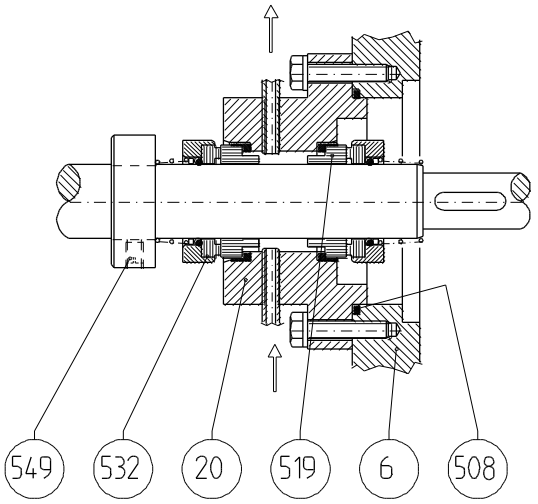
Interior mechanical seal, balanced.



Item no.	Description
6	back plate
20	seal seat
508	O-ring
567	mechanical seal

8.9.4. Version Q1

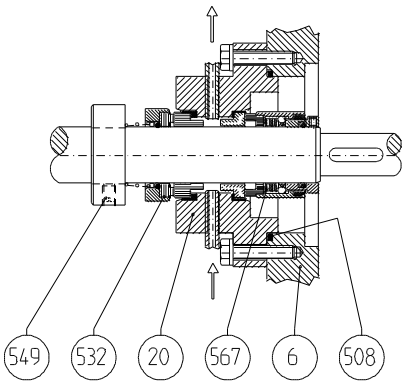
Interior unbalanced mechanical seal with unbalanced quench seal.



Item no.	Description
6	back plate
20	seal seat
508	O-ring
519	mechanical seal
532	mechanical seal with left-wound spring
549	set ring

8.9.5. Version Q2

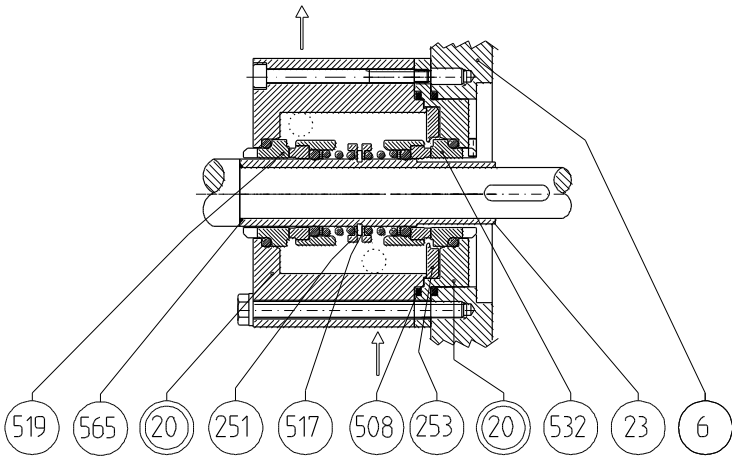
Interior balanced mechanical seal with unbalanced quench seal.



Item no.	Description
6	back plate
20	seal seat
508	O-ring
532	mechanical seal with left-wound spring
549	set ring
567	mechanical seal

8.9.6. Version F1

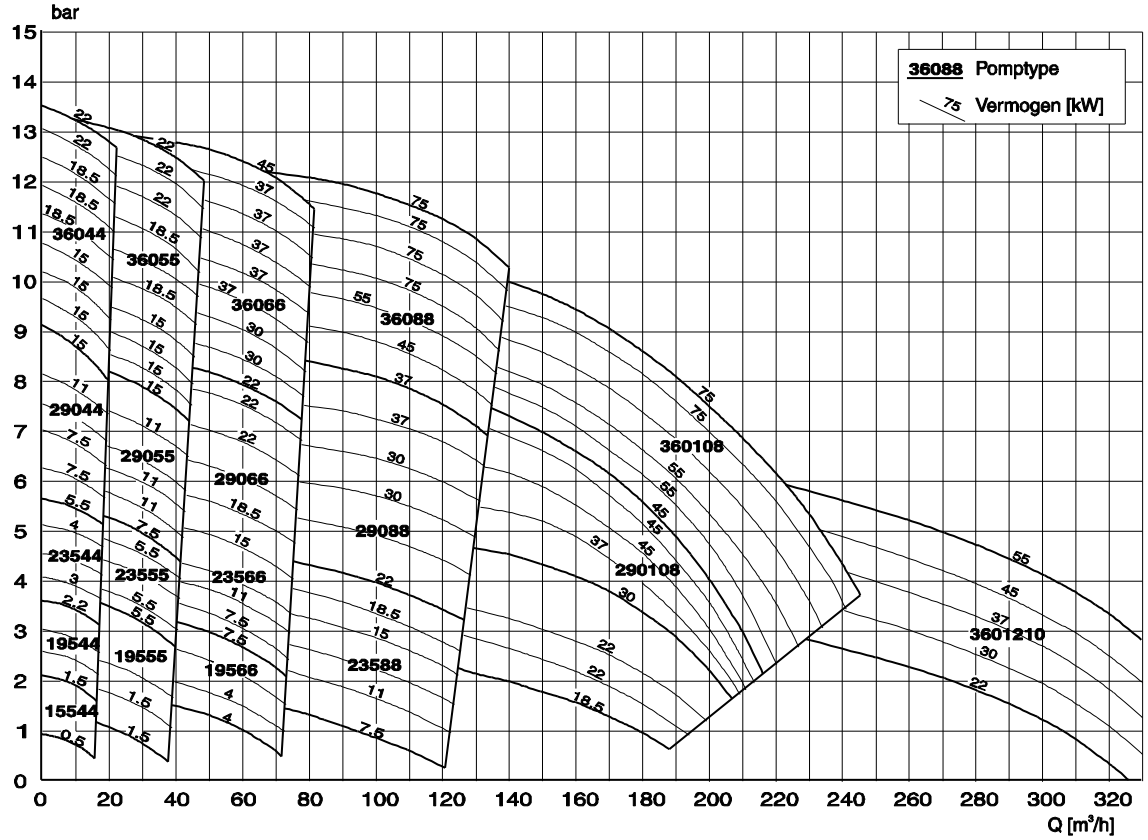
Double mechanical seal, back-to-back, unbalanced.



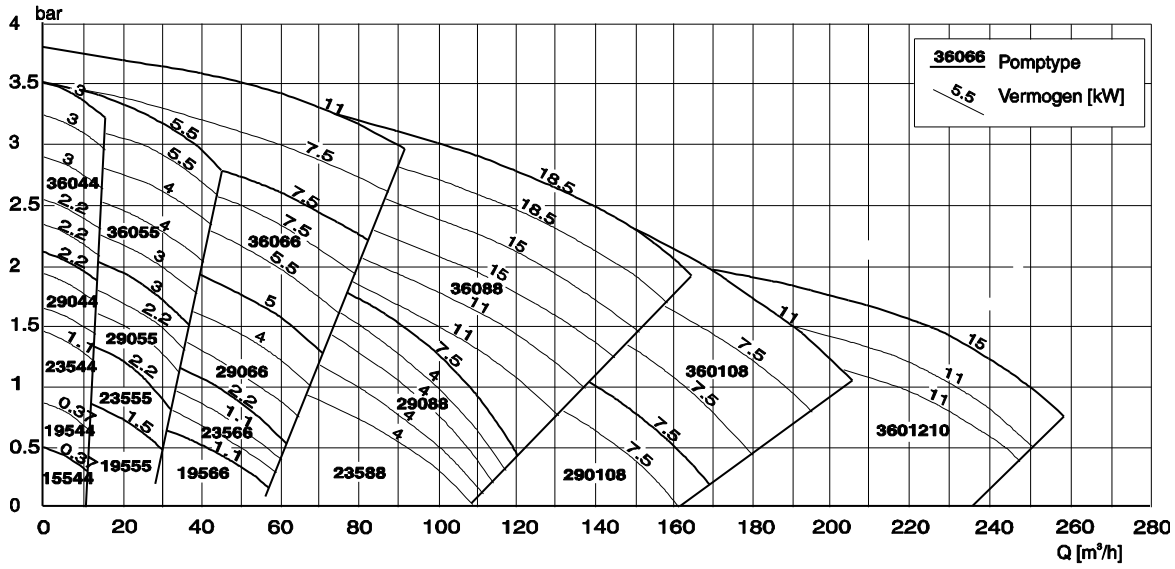
Item no.	Description
6	back plate
20	seal seat
20	seal seat back-to-back with liquid lock
23	shaft sleeve
251	support ring
253	lock ring for static seal ring
508	O-ring
517	circlip
519	mechanical seal (atmospheric side)
532	mechanical seal with left-wound spring (pump side)
565	O-ring

9. Performance curves

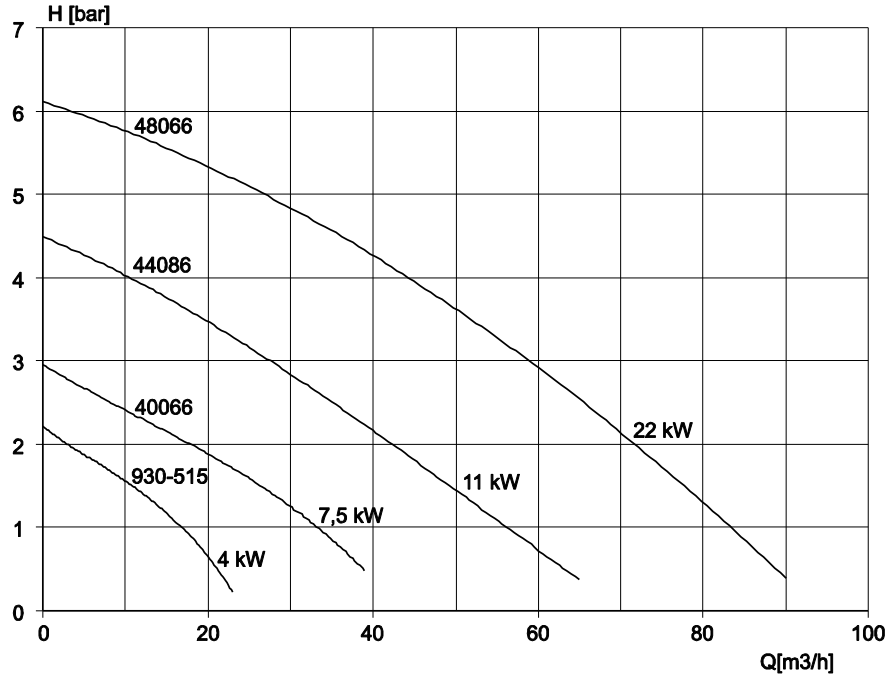
9.1. CP and CP/ZA, 2900 min^{-1}



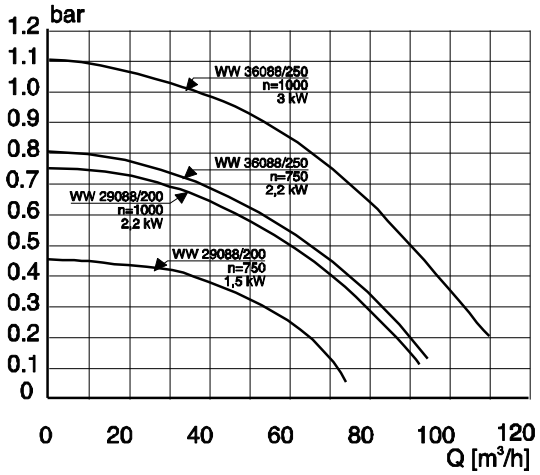
9.2. CP and CP/ZA , 1450 min^{-1}



9.3. ZA , 1450 min^{-1}



9.4. Whey curd pump, 1000/750 min^{-1}



10. Trouble shooting

A malfunction in a pump system may have various causes. The malfunction is not always necessarily in the pump itself, but can also be caused by a malfunction in the piping system, or in another appendage in the system. If the operating conditions differ too greatly from the specifications by which the pump was purchased this can also cause malfunctioning. Therefore always check first:

- Has the pump been installed correctly?
- Are the operating conditions still according to the initial specifications?
- Are the other appendages in the pipe system functioning correctly?
-

In general terms, the following malfunctions in a pump can be distinguished:

1. pump gives no or little liquid
2. pump does not reach duty point
3. pump gives irregular liquid flow
4. pump leaks
5. pump vibrates excessively
6. pump makes too much noise
7. motor overheats
8. pump cuts out thermally
9. pomp has seized

The table on the next page gives a possible cause and solution for the malfunctions mentioned above:

Malfunction										Cause	Action
1	2	3	4	5	6	7	8	9			
	✔				✔	✔				electrical connection defective	Have qualified electrician check the electric connections
	✔									wrong rotation direction	Have qualified electrician reverse the sense of rotation of the electric motor
✔										pump is not completely filled with liquid (only for CP)	Top up the pump entirely with liquid
✔	✔	✔			✔					insufficient pre-pressure	Increase the pre-pressure or place the pump on a lower position
	✔						✔			pump operating at the wrong speed	Check the motor speed
								✔		contaminations or objects in the pump	Clean the pump, if necessary disassemble
✔	✔	✔								air in the piping	Inspect the piping
	✔									valve in suction pipe is not completely open	Entirely open the valve in the suction pipe
	✔									pump selected with too small delivery head	Install another pump
✔	✔	✔						✔		suction pipe or filter blocked	Clean the suction pipe or the filter
			✔							shaft seal defective	Disassemble the pump and replace the shaft seal
			✔							O-ring seal defective	Disassemble the pump and replace the O-ring seal
							✔			liquid temperature is too high	Decrease the liquid temperature
✔							✔	✔		impeller is jammed	Disassemble the pump and replace the impeller
				✔	✔		✔	✔		impeller is damaged	Disassemble the pump and replace the impeller
				✔	✔	✔	✔	✔		motor shaft is bent	Replace the motor
				✔	✔	✔	✔	✔		extension shaft is loose	Disassemble the pump, inspect the extension shaft, reassemble it and readjust.
				✔	✔	✔	✔	✔		bearings are damaged or worn	Replace the motor. For IG(F): replace the bearings
							✔	✔		motor is overloaded	Check the viscosity of the liquid. Switch off the motor and check if the pump does not drag. If so, disassemble the pump and repair it

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